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EXAMINER	
SUAREZ, FELIX E	

ART UNIT	PAPER NUMBER
2857	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/556,482	AJAY ET AL.	
	Examiner	Art Unit	
	FELIX E. SUAREZ	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30,32-39 and 41-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30,32-39 and 41-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 November 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *14November2005*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because:

In Figures 1, 2, 4 and 9, blocks are not labeled. Correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 44 and 45 are rejected under 35 U.S.C. 112, first paragraph, because the best mode contemplated by the inventor has not been disclosed. Evidence of concealment of the best mode is based upon the quality of the applicant's claim is so poor, because means for a method (or apparatus) substantially as herein described with reference to at least one of the accompanying drawings; and claims 44 and 45 effectively results in concealment. See MPEP § 2164.08(a) Single Means Claim.

Claims 44 and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. These claims are omnibus type claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-9, 11, 13-26, 41 and 46 are rejected under 35 U.S.C. 102(b) as being unpatentable over Walters et al. (U.S. Patent No. 5,388,445).

With respect to claim 1, Walters teaches a method (or a computer program product) of determining the time of flight of a signal transmitted between a transmitter and a receiver, said method comprising the steps of:

transmitting a first signal comprising at least one characteristic waveform feature (see col. 2, lines 18-27, determining at a given position on a pipeline a time of arrival of a pressure wave front traveling through fluid in the pipeline);

transmitting a second signal comprising at least one characteristic waveform feature (see col. 2, lines 18-27, determining at a given position on a pipeline a time of arrival of a pressure wave front traveling through fluid in the pipeline due to an event which causes fluctuation of pressure in such fluid; and a subset of a plurality of the pressure values is selected) and a waveform modification introduced at a predetermined point in time of the duration of the

second signal (see col. 10, lines 60-62, it is necessary to verify the disturbance which was noted has resulted in a significant change in the pipeline operating conditions; and FIG. 7, Time of Occurrence (X to A) point);

receiving said first and second transmitted signals (see col. 3, lines 44-54, determining an arrival time and amplitude of pressure wave front traveling through fluid in a pipeline due to an event which causes fluctuation of pressure);

determining a point of diversion between corresponding characteristic waveform features of the first and second received signals comprising super positioning said first and second received signals such that said point of diversion corresponds to an arrival time of the introduced waveform feature modification at the receiver (see col. 3, lines 44-54, determining an arrival time and amplitude of pressure wave front traveling through fluid in a pipeline due to an event which causes fluctuation of pressure).

With respect to claim 14, Walters a method of determining the time of flight of a signal transmitted between a transmitter and a receiver, said method comprising the steps of:

transmitting a first and a second signal, where both signals comprise at least one characteristic waveform feature and the second signal (see col. 2, lines 18-27, determining at a given position on a pipeline a time of arrival of a pressure wave front traveling through fluid in the pipeline due to an event which causes fluctuation of pressure in such fluid; and a subset of a plurality of the pressure

values is selected) further comprises a waveform modification introduced at a predetermined point in time of the duration of the second signal (see col. 10, lines 60-62, it is necessary to verify the disturbance which was noted has resulted in a significant change in the pipeline operating conditions; and FIG. 7, Time of Occurrence (X to A) point);

receiving said first and second transmitted signals (see col. 3, lines 44-54, determining an arrival time and amplitude of pressure wave front traveling through fluid in a pipeline due to an event which causes fluctuation of pressure);

scanning through said received signals in time to determine a point of diversion between corresponding characteristic waveform features of the first and second received signals, wherein said point of diversion corresponds to a time of reception of the introduced waveform feature modification at the receiver (see col. 3, lines 44-54, determining an arrival time and amplitude of pressure wave front traveling through fluid in a pipeline due to an event which causes fluctuation of pressure).

With respect to claims 2 and 15, Walters further teaches that, the step of determining a point of diversion further comprises:

calculating the difference between a value of the first received signal and a corresponding value of the second received signal at each point of occurrence of a characteristic waveform feature within the first received signal (see col. 3,

lines 20-21, a mean and a standard deviation of all of the slopes in the slope history are derived);

designating the point of diversion as the first point of occurrence at which the calculated difference is greater than the value of the second received signal (see col. 3, lines 40-43, the first signal is rejected as being caused by an event if the second signal is indicative of an amplitude below a specific threshold selected as indicative of noise).

With respect to claims 3 and 16, Walters further teaches that, the step of:

calculating the difference between the time of the point of diversion and the time of transmission of the introduced waveform feature modification (see col. 3, lines 55-64, time of arrival of a pressure wave front traveling through fluid of the pipeline due to an event which causes fluctuation of pressure in such fluid with means for measuring at the given position a characteristic related to the pressure of the fluid).

With respect to claims 4 and 17, Walters further teaches that, comprising the steps of:

measuring a time relationship between a nominated characteristic waveform feature and the point of diversion (see col. 3, lines 55-64, time of arrival of a pressure wave front traveling through fluid of the pipeline due to an event which causes fluctuation of pressure in such fluid with means for

measuring at the given position a characteristic related to the pressure of the fluid) and;

calculating the difference between the time of reception, based on the measured time relationship, and the time of transmission of the nominated characteristic waveform feature (see col. 3, lines 55-64, time of arrival of a pressure wave front traveling through fluid of the pipeline due to an event which causes fluctuation of pressure in such fluid with means for measuring at the given position a characteristic related to the pressure of the fluid, and deriving from the measured characteristic pressure values corresponding to respective discrete times occurring during an interval of time).

With respect to claim 5, Walters further teaches that, the nominated characteristic waveform feature is a feature of a first unmodified signal and the method further comprises the steps of:

transmitting a plurality of subsequent first unmodified signals (see col. 2, lines 27-38, a selection is made of a first duration of a time window which encompasses a plurality of the pressure values, and relating the derived pressure values to respective time windows); and

determining the time of flight of the plurality of subsequent first unmodified signals by calculating the difference between the time of reception, based on the measured time relationship, and the time of transmission of the nominated characteristic waveform feature of each respective one of the plurality of

subsequent first unmodified signals (see col. 2, lines 38-46, the measure characteristic is converted to a signal indicative of the time of arrival of the pressure wave front by comparing the slope of the current straight line to a threshold derive from a plurality of slopes).

With respect to claim 6, Walters further teaches, comprising the step of:

repeating the steps of transmitting and receiving such that successive first and second signals are super positioned at the step of determining (see col. 2, lines 27-38, a selection is made of a first duration of a time window which encompasses a plurality of the pressure values, and relating the derived pressure values to respective time windows).

With respect to claim 7, Walters further teaches that, the characteristic waveform feature of a signal is one of:

a) a peak (see col. 9, lines 24-28, peak-to-peak noise in a pipeline; see col. 14, lines 6-10, to compute the amplitude of the wave front; and FIG. 7, Amplitude estimated; and FIG. 3);

b) a combination of peaks (see col. 9, lines 24-28, peak-to-peak noise in a pipeline; see col. 14, lines 6-10, to compute the amplitude of the wave front; and FIG. 7, Amplitude estimated);

c) a zero-crossing (see col. 14, lines 17-20, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and FIG. 7, zero-crossing point at SLOPE S_R and SLOPE S_C);

d) a combination of zero-crossings (see col. 14, lines 17-20, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and FIG. 7, zero-crossing point at SLOPE S_R and SLOPE S_C).

With respect to claim 8, Walters further teaches that, the waveform modification is introduced near the start of a signal (see FIG. 7, REF. LINE POSITION COUNTER and TIME OF OCCURRENCE X TO A).

With respect to claim 9, Walters further teaches that, the waveform modification is introduced at one of the third, fourth or fifth waveform peak after the onset of a signal (see FIG. 7 peaks under REFERENCE LINE).

With respect to claim 10, Walters further teaches that, the waveform modification comprises a phase inversion (see col. 3, lines 20-21, a mean and standard deviation of all slopes in the slop history; mean is an absolute value for a wave e inverts negative phase wave to positive wave phase).

With respect to claim 11, Walters further teaches that, the transmitted and received signals are ultrasonic signals (see col. 1, lines 26-35, pressure transient immediately forms a pressure wave which travels both up-stream and down-stream at the speed of sound in the fluid flowing in the pipeline).

With respect to claims 13 and 20, Walters teaches an apparatus adapted to determine the time of flight of a signal transmitted between a transmitter and a receiver, said apparatus comprising:

processor means adapted to operate in accordance with a predetermined instruction set, said apparatus, in conjunction with said instruction set, being adapted to perform the method of claim 1 (see col. 9, lines, the digital signal processor 5, accepts the data samples from the A/D converter, executes a wave front detection algorithm and generates the arrival time and amplitude outputs).

With respect to claim 18, Walters further teaches that, Claim for a plurality of subsequent transmitted first unmodified signals, the time of flight is determined by:

calculating the difference between the time of reception, based on the measured time relationship, and the time of transmission of the nominated characteristic waveform feature of respective subsequent first unmodified signals without reference to the point of diversion (see col. 3, lines 20-28, a mean and standard deviation of all of the slopes in the slope history are derived).

With respect to claim 19, Walters further teaches that, the nominated characteristic waveform feature of the respective subsequent signals is tracked to allow for variations in arrival time due to physical changes in the transport medium between the transmitter and receiver (see col. 3, lines determining at a

given position on a pipeline a time of arrival of a pressure wave front traveling through fluid in a pipeline due to an event which causes fluctuation of pressure in such fluid with means for measuring at the given position a characteristic related to the pressure values).

With respect to claim 21, Walters further teaches comprising the steps of:

selecting a characteristic waveform feature of a first signal in accordance with predetermined selection criteria based on the point of diversion (see col. 2, lines 18-27, determining at a given position on a pipeline a time of arrival of a pressure wave front traveling through fluid in the pipeline);

transmitting and receiving a plurality of first signals (see col. 2, lines 18-27, determining at a given position on a pipeline a time of arrival of a pressure wave front traveling through fluid in the pipeline due to an event which causes fluctuation of pressure in such fluid; and a subset of a plurality of the pressure values is selected);

detecting zero-crossings of the received plurality of first signals which indicate the presence of the selected characteristic waveform feature in each of the received plurality of first signals (see col. 14, lines 17-20, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and FIG. 7, zero-crossing point at SLOPE S_R and SLOPE S_C);

estimating a position of the selected characteristic waveform feature of the received plurality of first signals in accordance with predetermined estimation criteria based on the detected zero crossings to provide a position estimation value (see col. 13, lines 50-65, x_R and x_M position; see col. 14, lines 17-20, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and FIG. 7, zero-crossing point at SLOPE S_R and SLOPE S_C);

processing the position estimation value to determine a corresponding estimation time (see col. 14, lines 17-30, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and P_R and P_M represent the starting point);

calculating the time of arrival of the selected characteristic waveform feature of at least one of the received plurality of first signals by adding a predetermined delay time to the estimation time (see col. 14, lines 17-30, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and time of arrival x_{TOA}).

With respect to claim 22, Walters further teaches that, the predetermined selection criteria comprise one of:

a) adding a predefined delay to the time of the point of diversion (see col. 14, lines 17-30, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and adding Off_R);

b) subtracting a predefined delay from the time of the point of diversion (see col. 14, lines 17-30, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and subtracting Off_M).

With respect to claim 23, Walters further teaches that, the predetermined estimation criteria comprise:

a) measuring the time of zero-crossings adjacent the selected characteristic waveform feature (see col. 14, lines 17-20, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and FIG. 7, average zero-crossing point at SLOPE S_R, SLOPE S_M and SLOPE S_C) and;

b) averaging the measured time of zero-crossings (see col. 14, lines 17-20, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and FIG. 7, average zero-crossing point at SLOPE S_R, SLOPE S_M and SLOPE S_C).

With respect to claims 24, Walters teaches an apparatus adapted to determine the time of flight of a signal transmitted between a transmitter and a receiver, said apparatus comprising:

processor means adapted to operate in accordance with a predetermined instruction set, said apparatus, in conjunction with said instruction set (see col. 9,

lines, the digital signal processor 5, accepts the data samples from the A/D converter, executes a wave front detection algorithm and generates the arrival time and amplitude outputs), being adapted to perform the method of claim 21 wherein said apparatus comprises:

signal transducing means for transmitting and receiving a plurality of first signals (see col. 8, lines 50-56, a transducer 1 is installed on the pipeline 2 so as to convert the internal fluid pressure to an analog electrical signal);

waveform feature selection means operatively connected to the signal transducing means and the processor means for selecting a characteristic waveform feature of a first signal in accordance with predetermined selection criteria based on the point of diversion (see col. 2, lines 18-27, determining at a given position on a pipeline a time of arrival of a pressure wave front traveling through fluid in the pipeline);

zero-crossing detection means operatively connected to transducing means and the processor means for detecting zero-crossings of the received plurality of first signals which indicate the presence of the selected characteristic waveform feature in each of the received plurality of first signals (see col. 13, lines 50-65, x_R and x_M position; see col. 14, lines 17-20, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and FIG. 7, zero-crossing point at SLOPE S_R and SLOPE S_C);

signal position estimation means operatively connected to the zero-crossing detection means and the processor means for estimating a position of the selected characteristic waveform feature of the plurality of received first signals in accordance with predetermined estimation criteria based on the detected zero-crossings to provide a position estimation value (see col. 13, lines 50-65, x_R and x_M position; see col. 14, lines 17-20, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and FIG. 7, zero-crossing point at SLOPE S_R and SLOPE S_C);

wherein the processor means processes the position estimation value to determine a corresponding estimation time and calculates the time of arrival of the selected characteristic waveform feature of at least one of the plurality of received first signals by adding a predetermined delay time to the estimation time (see col. 14, lines 17-30, the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and P_R and P_M represent the starting point and time of arrival x_{TOA}).

With respect to claim 25, Walters further teaches said signal position estimation means comprises a dual slope integrator (see col. 15, lines 52-55, best-fit maximum slope line circuit; and FIG. 5 ITEM 36).

With respect to claim 26, Walters further teaches said plurality of received first signals are digitized and said processor means comprises digital data processing means comprising said zero-crossing detection means and said signal position estimation means (see col. 9, lines 48-52, DSP and A/D converter).

With respect to claim 46, Walters teaches a method of determining the time of flight of a signal transmitted between a transmitter and a receiver, said method comprising the steps of:

transmitting a first signal comprising at least one characteristic waveform feature (see col. 2, lines 18-27, determining at a given position on a pipeline a time of arrival of a pressure wave front traveling through fluid in the pipeline);

transmitting a second signal comprising at least one Characteristic waveform feature (see col. 2, lines 18-27, determining at a given position on a pipeline a time of arrival of a pressure wave front traveling through fluid in the pipeline due to an event which causes fluctuation of pressure in such fluid; and a subset of a plurality of the pressure values is selected) and a waveform modification introduced at a predetermined point in time of the duration of the second signal (see col. 10, lines 60-62, it is necessary to verify the disturbance which was noted has resulted in a significant change in the pipeline operating conditions; and FIG. 7, Time of Occurrence (X to A) point);

receiving said first and second transmitted signals (see col. 3, lines 44-54, determining an arrival time and amplitude of pressure wave front traveling through fluid in a pipeline due to an event which causes fluctuation of pressure);

determining, a point of diversion between corresponding characteristic waveform features of the first and second received signals comprising super positioning said first and second received signals such that said point of diversion corresponds to an arrival time of the introduced waveform feature modification at the receiver (see col. 3, lines 44-54, determining an arrival time and amplitude of pressure wave front traveling through fluid in a pipeline due to an event which causes fluctuation of pressure), wherein the step of determining a point of diversion further comprises:

calculating the difference between a value of the first received signal and a corresponding value of the second received signal at each point of occurrence of a characteristic waveform feature within the first received signal (see col. 3, lines 20-21, a mean and a standard deviation of all of the slopes in the slope history are derived);

designating the point of diversion as the first point of occurrence at which the calculated difference is greater than the value of the second received signal (see col. 3, lines 40-43, the first signal is rejected as being caused by an event if the second signal is indicative of an amplitude below a specific threshold selected as indicative of noise) and wherein the method further comprises measuring a time relationship between a

nominated characteristic waveform feature and the point of diversion (see col. 3, lines 55-64, time of arrival of a pressure wave front traveling through fluid of the pipeline due to an event which causes fluctuation of pressure in such fluid with means for measuring at the given position a characteristic related to the pressure of the fluid) and;

calculating the difference between the time of reception, based on the measured time relationship, and the time of transmission of the nominated characteristic waveform feature (see col. 3, lines 55-64, time of arrival of a pressure wave front traveling through fluid of the pipeline due to an event which causes fluctuation of pressure in such fluid with means for measuring at the given position a characteristic related to the pressure of the fluid, and deriving from the measured characteristic pressure values corresponding to respective discrete times occurring during an interval of time) and wherein the nominated characteristic waveform feature is a feature of a first unmodified signal and the method further comprises the steps of:

transmitting a plurality of subsequent first unmodified signals (see col. 2, lines 27-38, a selection is made of a first duration of a time window which encompasses a plurality of the pressure values, and relating the derived pressure values to respective time windows) and;

determining the time of flight of the plurality of subsequent first unmodified signals by calculating the difference between the time of reception, based on the measured time relationship, and the time of transmission of the nominated characteristic waveform feature of each respective one of the plurality of subsequent first unmodified signals (see col. 2, lines 38-46, the measure characteristic is converted to a signal indicative of the time of arrival of the pressure wave front by comparing the slope of the current straight line to a threshold derive from a plurality of slopes).

4. Claims 29, 32, 34-39 are rejected under 35 U.S.C. 102(b) as being unpatentable over Schoenfelder et al. (IDS, European Patent Application EP 1 006 500 A2 2/12/1999) in view of Walters et al. (U.S. Patent No. 5,388,445).

With respect to claims 29 and 43 Schoenfelder teaches a method (or a computer program product) of detecting one or more blocked sampling holes in a pipe of an aspirated smoke detector system comprising:

ascertaining the base flow of fluid through a particle detector using a flow sensor (see col. Paragraph [0010], aspiration unit such as fan, blower, or pump, could be made small enough to fit within a smoke sensor);

monitoring subsequent flow through the particle detector (see col. 2 paragraph [0012], detector with a communication link to a remote system control unit);

comparing the subsequent flow with the base flow, and indicating a fault if the difference between the base flow and the subsequent flow exceeds a predetermined threshold (see col. 10, paragraph [0076] a flow trouble threshold is established).

With respect to claim 30, Schoenfelder further teaches that, the flow sensor is an ultrasonic flow sensor (see col. 5, paragraph [0029], the system include an audible alarm such as sirens horns).

With respect to claim 32, Schoenfelder further teaches that, the difference between base flow and 30 subsequent flow is compared over a length of time (see cool. 10 paragraph [0073], subsequent to generate a trouble signal a predetermined time is permitted and verifying the operation of air flow).

With respect to claim 34, Schoenfelder teaches an aspirated smoke detector comprising a particle detector, a sampling network and an aspirator (see col. Paragraph [0010], aspiration unit such as fan, blower, or pump, could be made small enough to fit within a smoke sensor), an inlet, an outlet and a flow sensor (see col. 3 paragraph [0016], filter for inflowing ambient air and filter for

out-flowing ambient air from the sensing chamber), wherein the flow sensor uses ultrasonic waves to detect the flow rate of air entering the particle detector (see col. 5, paragraph [0029], the system include an audible alarm such as sirens horns).

With respect to claim 35, Schoenfelder further teaches that, the flow sensor measures the partial flow of fluid through a sampling network (see col. 3 paragraph [0016], filter for inflowing ambient air and filter for out-flowing ambient air from the sensing chamber).

With respect to claim 36, Schoenfelder further teaches that, the particle detector detects particles in a portion of the air flow flowing through the sampling network (see col. 3 paragraph [0016], filter for inflowing ambient air and filter for out-flowing ambient air from the sensing chamber).

With respect to claim 37, Schoenfelder further teaches that, the flow sensor is located in the sampling network (see col. 3 paragraph [0016], filter for inflowing ambient air and filter for out-flowing ambient air from the sensing chamber).

With respect to claim 38, Schoenfelder further teaches that, the flow sensor is located in a housing for the particle detector (see col.9 paragraph [0065], cylindrical housing).

With respect to claim 30, Schoenfelder further teaches, having a branch in the inlet allowing air to bypass the particle detector (see col. 9 paragraph [0066], inflowing air, entering via the annular channel, passes through the filter).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walters et al. (U.S. Patent No. 5,388,445) in view of Hill et al. (U.S. Patent No. 5,131,052).

With respect to claim 12, Walters et al. (hereafter Walters) teaches all the features of the claimed invention, except that Walters does not teach; wherein the ultrasonic signals are provided by transducers driven at resonant frequencies in a frequency range of about 60 kHz to about 90 kHz.

But Hill et al. (hereafter Hill) teaches in a mid-range loudspeakers assembly propagating waves in phase, that the loudspeaker generally referred

as mid-range speaker operate over a frequency range of approximately 150 kHz to 6 kHz.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Walters to include mid-range loudspeakers assembly propagating waves as taught by Hill, because the mid-range loudspeakers assembly propagating waves of Hills allows to operate over a frequency range of approximately 150 kHz to 6 kHz, as desired.

6. Claims 27, 28, 33 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schoenfelder et al. (European Patent Application EP 1 006 500 A2 2/12/1999) in view of Walters et al. (U.S. Patent No. 5,388,445).

With respect to claims 27, 33 and 42 Schoenfelder et al. (hereafter Schoenfelder) teaches a method (a processor or a computer program product) of monitoring flow through a particle detector of an aspirated smoke detector system, the method comprising the steps of:

ascertaining the base flow of fluid through a particle detector using a flow sensor (see col. Paragraph [0010], aspiration unit such as fan, blower, or pump, could be made small enough to fit within a smoke sensor);

monitoring subsequent flow through the particle detector (see col. 2 paragraph [0012], detector with a communication link to a remote system control unit);

comparing the subsequent flow with the base flow, and indicating a fault if the difference between the base flow and the subsequent flow exceeds a predetermined threshold wherein base flow and subsequent flow are determined at respective times (see col. 10, paragraph [0076] a flow trouble threshold is established) according to the following general flow calculation:

f=SxA

where f = volumetric flow (see col. 9 paragraph [0064], the detector includes a volume air flow);

A = cross sectional area of an air flow path through the detector system (see col. 9 paragraph [0064], the detector includes a cylindrical housing) ;

Schoenfelder does not teach;

where

s = speed of air through the detector system such that s is given by;

$$s = \frac{d}{2}\left(\frac{1}{t_2} - \frac{1}{t_1}\right)$$

where

t_2 is the transit time of a signal transmitted in a forward direction, being generally in the direction of flow, from a first transducer located adjacent the flow path to a second transducer located generally opposite the first transducer and adjacent the flow path;

tz is the transit time of a signal transmitted in a reverse direction, being generally against the direction of flow, from the second transducer to the first transducer;

d is a distance traveled by the signal between the first and second transducer;

and wherein both t_1 and t_2 are determined in accordance with the method claim 1.

But Walters et al (hereafter Walters) teaches, that the arrival time is considered to be the x-coordinate of the intersection of the reference line and the maximum slope line; and P_R and P_M represent the starting point and time of arrival x_{TOA} (see walters; col. 14, lines 17-30).

Walters also teaches that receiver, determining an arrival time and amplitude of pressure wave front traveling through fluid in a pipeline due to an event which causes fluctuation of pressure (see Walters; col. 3, lines 44-54).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Schoenfelder to include an arrival time and amplitude of pressure wave front traveling through fluid in a pipeline as taught by Walters, because the arrival time and amplitude of pressure wave front traveling through fluid in a pipeline of Walters allows to calculate the speed given by universal equation velocity is equal to distance divided by the time, as desired.

With respect to claim 28 Schoenfelder in combination with Walters teaches all the features of the claimed invention; and Schoenfelder further teaches an apparatus adapted to monitor flow through a particle detector of an aspirated smoke detector system, said apparatus comprising:

processor means adapted to operate in accordance with a predetermined instruction set, said apparatus, in conjunction with said instruction set, being adapted to perform the method of claim 27 (see col.1 paragraph [0007], a the control circuit is a part of a programmed processor).

Conclusion

Prior Art

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wiemeyer et al. [U.S. Patent No. 5,926,098] describes an aspirated detector.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Felix Suarez, whose telephone number is (571) 272-2223. The examiner can normally be reached on weekdays from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Eliseo Ramos-Feliciano can be reached on (571) 272-7925. The fax phone number for the organization where this application or proceeding is

assigned is 571-273-8300 for regular communications and for After Final communications.

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F.S.

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